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Our "Service" for Your Industrial Fuel Department

The development of gas for Industrial fuel purposes has been so rapid that many gas men who have not followed it closely do not realize the vast opportunities it offers to almost every gas company, no matter how limited the area it serves, to steadily increase its industrial load.

The AMERICAN GAS ENGINEERING JOURNAL has published since Jan. 1, 1917, over 150 articles on this subject. It has given the complete story of industrial installations in almost every line of industry—pointing out the advantages and economies to the consumers, also giving complete information as to the proper equipment to be used in each case.

It is obviously impossible for the industrial gas salesmen to remember all these details. For his convenience we will begin publication soon after Jan. 1, 1918, a series of from 3 to 5 abstracts every week of industrial fuel articles, giving in each one all the data that the industrial man might require to answer intelligently any questions a prospective customer in any line of manufacture might ask.

These abstracts will be published in such form and measurement that they can be readily clipped out and inserted in their proper places in loose leaf binders of convenient pocket size.

Announcement will be made in a later issue of the Journal just when the first instalment of abstracts will appear, and we advise the industrial fuel department of every company to clip these abstracts, beginning with the first issue, so as to have a complete file for binder.

American Gas Engineering Journal

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AMERICAN
GAS ENGINEERING JOURNAL

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CVII, No. 24 NEW YORK, DECEMBER 15, 1917 Whole No. 3119

Ranging From the Stock Pot to the Gas-Fired Rotisseries, the Field for Auxiliary Appliances in Hotels and Restaurants is so Wide as to Offer Most Promising Prospects

Principal Attention of Companies Has Been Centered on Ranges to Neglect of Appliances of Little Less Relative Importance — Economies in the Use of the Auxiliaries

By GILBERT C. SHADWELL

Of the gas appliances used in hotels and restaurants, the hotel range has probably received the maximum of attention, so much so that other auxiliary appliances have been largely neglected.

There is not a restaurant, hotel, hospital or club that does not make soup, cook vegetables and meat. All such places need one or more stock-pots.

Public schools, cafes, saloons and many institutions supply soup almost daily, and require it to be served instantly. The field is a tremendous one.

Of those who are making soup, there are probably not 50 per cent who are doing the work efficiently, and they will welcome gas-heated stock-pots, such as that shown in Fig. 1, because no steam is required; they can obtain "the goods" quickly, and the chef does not have to depend on anybody or anything else.

A pilot attachment ensures instant heat, and the temperature can be controlled to any desired degree quickly and without trouble. When a kitchen is converted to "all-gas," a stock-pot cannot be omitted.

Not only can it be used for making soup, but it may be employed for boiling potatoes, cabbage and all vegetables; for cooking goulash, stews and the like, and for boiling hams, meats, etc.

Some hotel kitchens use live steam or else place a pot or kettle right on top of the range or stove. Both of these methods are undesirable, because unless the steam or range are "going" no soup can be made. A stock-pot should be a separate unit by itself.

A substantial bib cock is fitted at the base of the pot for drawing off the liquid, and inside, at this point, there is a removable strainer which prevents the drain becoming clogged.

A concentric ring burner of suitable dimensions is fitted to all sizes. This gives a very wide range of heat control, and ensures quick heating at the right temperature.

Beneath the burner there is a sheet metal baffle. This directs the secondary air and prevents the radiation of heat beneath it.

FIG. 1—GAS-HEATED STOCK-POT SERVES A VARIETY OF USES

A pilot is fitted which makes it easy to start the heat instantly at any time of the day or night, and a peek-hole of suitable size is provided for the observation of the burner in operation.

The stock-pots are particularly efficient, as the flue gases are discharged between the furnace body and the

FIG. 2—A TWENTY-SLICE GAS-FIRED TOASTER

kettle in such a way that they have an upward tendency along the outside. This results in a saving of time, as it causes the stock to give up its soluble parts completely to the liquid and thus yields a very high quality of soup.

Toasters

The use and importance of toasters is as great if not greater than that of stock-pots.

Fig. 2 shows one size of a design of which there are many hundreds in use all over the country, from the smallest and humblest lunch counter to the largest and best hotel.

The following table shows capacities of the different sizes:

1 A	3 slices
2 A	6 slices
3 A	9 slices
*4 A aluminum finish	20 slices

*Made for the largest and busiest kitchens. Toasts twenty slices on both sides at once in two minutes. Its large toasting capacity makes it easy to supply hot toast in any quantity on short notice.

These toasters are arranged with burners above and below each shelf, so that bread is browned on both sides at the same time. The bread will not curl and no turning is necessary.

They can be adjusted to brown the bread all the way through or to toast only the outside, leaving the center moist, as preferred. Time approximately two minutes. The nine-slice size toasts nine slices at once, or approximately 279 slices per hour.

This size is that in most common use.

These appliances are designed to give the results long desired by the best chefs. The bread is easily visible while toasting, so that no turning or watching is necessary. The design and construction has been proven to be correct under very strict tests. The heavy construction enables them to withstand the hard usage they are subjected to in the hotel kitchen.

Saving in Labor

Hotels and restaurants lose money when they toast bread over a hole in the range, in the oven, or on a cake griddle, because that space is far more valuable for other purposes. Moreover, some one must watch the toasting in such a case. With these appliances, toast can be served at a profit, because it is turned out without any cost for labor or space.

Hospitals and sanitariums require their toast to be browned crisply clear through to the center, for when so prepared it is more easily digested. These toasters may readily be adjusted to give exactly this result, and they have found wide favor in hospitals on this account.

Railway restaurants find these toasters particularly well suited to the demands of their customers, who invariably demand prompt service. The toast may be prepared almost as quickly as the coffee is drawn.

The finish to be chosen depends upon the character of the installation. The black finish is recommended for hotel and restaurant kitchens. The nickel-plated appliances are usually preferred by hospitals, because such institutions desire the pleasing and cleanly appearance of a bright finish. The nickeled-finish is perfectly satisfactory for this class of service, but it is not sufficiently durable to withstand the hard service of restaurant use. When the toasters are installed in restaurants where they are in sight of patrons the aluminum finish is preferable. The aluminum finish will burn off in time, but it is easily and cheaply renewed.

Cleaning the toaster requires only that the shelves be lifted out and brushed.

FIG. 3—GAS BROILER BUILT TO CONFORM TO IDEAS OF MOST EXACTING CHEFS

The burners have adjustable orifices.

In operating the toasters the gas should be lighted a few minutes before the first toast is made, in order to warm up the appliance.

To Set Up and Adjust

A lever handle cock should be installed in the gas line, if there is any fluctuation in the gas pressure, and so that the operator may reduce his heat, without changing the adjustment of the burners.

Should adjustment be required, start with the lower burner and give it sufficient gas by turning the nut on the adjustable orifice, so that at the minimum pressure the flame will reach to the front casting of the toaster. The baffle above the burner is constructed so as to make the flame float over its whole under surface. If the shelf above this burner is removed, it will be noted that the flame is burning perfectly. Do not adjust for a sharp flame when the shelf is in place.

Next, adjust the second burner from the bottom, so that it toasts the top of the bread in the same time the underside is toasted. Then adjust the third burner from the bottom in the same way, etc.

Plate Warmers

Every hotel and restaurant requires some method of keeping its plates and dishes hot. It is also most desirable that the plate warming outfit constitute a separate unit from the range. For this purpose a warming oven is used.

Description of Low Temperature of Warming Ovens

The low temperature ovens are particularly suitable for hotel and restaurant use for warming plates, dishes, buns, etc. They may also be employed for drying and lacquering where the pieces to be handled are of light weight and where a temperature of not more than 300 deg. Fahr. is required. They are also being extensively used for drying hair, drugs, special wood shapes, and many other materials too numerous to mention.

They are made in two styles, single wall and double wall. The double wall oven is preferable for most purposes. Direct heat is employed in both cases.

Construction

These ovens are constructed of galvanized sheet steel.

A flue collar is provided at the top. Occasionally they are made with vent holes at the sides, or at front and back.

A door of double thickness is fitted to all sizes.

Three removable shelves are supplied with each oven. These are equally spaced. The bottom shelf is from 3 to 5 in. from the floor of the oven, depending on the size. In the largest an additional self bracket is provided midway between shelves. These shelves are of galvanized sheet steel with holes punched in them.

All low-temperature ovens are constructed with either single or double walls to suit individual needs. The inside width of single-wall ovens is approximately the same as the over-all width. In double-wall ovens it is 2 in. less than over-all. The inside depth of single-wall ovens is 1 in. less than the over-all depth. The inside height of single-wall ovens is 1½ in. to 3 in. more than the height of the door opening. In double-wall ovens it is ½ in. to 1½ in. more than the height of door opening.

FIG. 4—GAS CHOP SUEY STOVE HAS A SPECIAL APPEAL ON ACCOUNT OF ITS CLEANLINESS

They are of exceptionally heavy construction and made to withstand the most severe work.

Hotel Broilers

The broiler is an appliance which is probably of as great importance as the hotel range.

The broiler shown in Fig. 3 is built to conform to all the specifications laid down by the most expert chefs.

The steaks are most beautifully marked, are broiled from below, as with charcoal, and are as easily accessible.

The temperature is easily regulated and may be as hot as desired, it being arranged with sufficient gas to heat from cold in four minutes. The expense of operation is entirely proportionate to the work done, as each grill may be used without heating the rest.

It does not flash readily, as the grease does not come in contact with the flame or burner, but drops into a pan below arranged for that purpose. In case of flashing, it may be quenched with water in the same way as is customary on charcoal.

The meat retains its juices, as it is seared on the under side first, so that they do not readily run out, and it is not dried up.

These broilers are very easily kept clean. The grills may be scrubbed with a brush while in position or removed and washed with other cooking utensils without difficulty, and there is absolutely no possible way for the burners to become clogged.

Chop Suey Stoves

The chop suey stove (an example of which is shown in Fig. 4) finds a place in almost every city. This work requires an intense heat for quick and efficient work. The chop suey is placed in shallow pans, which are

placed on the openings with or without one or more of the loose rings or not as required by the size of pan employed. A little water is added to the pan, and for this purpose faucets with swivel arms are provided with each stove.

The Chinese are, above all, scrupulously clean in their work, and they require an appliance which can be kept neat and clean at all times. With this fact in mind, the top of the stove is made to slope down to the right-hand back corner, where there is a drain. This enables any spilled material to be washed off easily and gives the appliance a cleanly appearance.

Cake Griddles and Frankfurter Stoves

The cake griddle or frankfurter stove shown in Fig. 5 is an appliance with which almost every gas man is

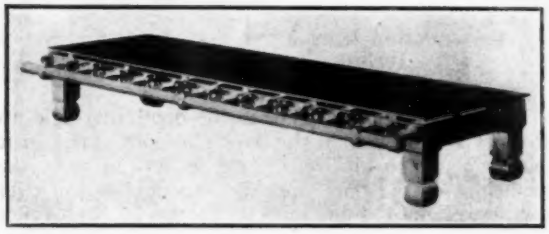

FIG. 5—THE CAKE GRIDDLE A FAMILIAR APPLIANCE TO MOST GAS MEN

familiar. The particular model shown was exhibited at the Panama-Pacific International Exposition in San Francisco, and embodies some very fine workmanship.

Fig. 6 shows an interesting type of heating stove, or, as the type is often termed, industrial stove.

Much depends on the construction of such appliances as to whether they operate efficiently or inefficiently. Too much care cannot be exerted in purchasing such appliances.

Gas-Fired Rotisseries

Almost everyone is familiar with those restaurants

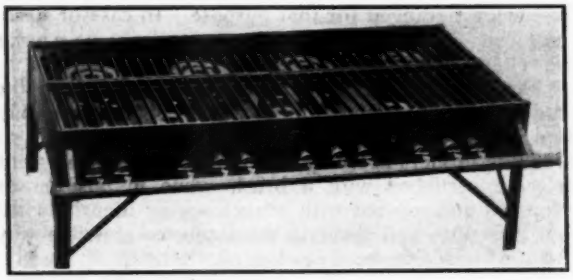

FIG. 6—AN INTERESTING TYPE OF HEATING STOVE

which roast chickens, ducks and other poultry by means of a rotisserie operated with coal or coke, but the average man is far less conversant with a gas-operated rotisserie. All the same, the work is being accomplished most satisfactorily in this way by means of an appliance such as is shown in Fig. 7.

There is a wide field for appliances of this kind, and when a chef's prejudice (if any) against gas can be overcome, splendid results can be invariably obtained.

The above references to the auxiliary appliances mentioned has by no means covered this very wide field. There are a hundred and one other appliances which could be mentioned, such as urn burners, cyclone burn-

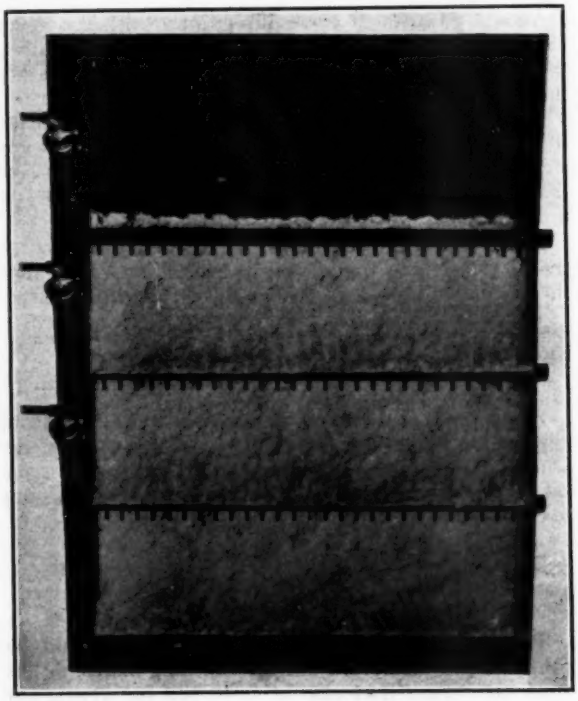

FIG. 7—GAS HAS AN INDISPUTABLE APPEAL TO ROTISSERIES

ers, bain maries, coffee urns, steam tables, bakers' ovens, etc. It is hoped, however, that sufficient has been said to point the way to increased activity in the sale of these appliances.

New Modified Welding Process for Repairing Aluminum Parts

Considerable difficulty has often been experienced in repairing broken or joining aluminum parts, due chiefly to subjecting the metal to excessive heat strain.

A writer to this Journal suggests a means of alleviating this difficulty by using a special solder. The only tools necessary to apply this solder are a blow-torch, an iron, a scratch brush and an ordinary file.

After the edges of the metal are thoroughly cleaned with a little gasoline and the wire scratch brush and the edges are dressed down with a file, the joint is then ready for heating. The solder melts rather freely and can readily be brushed into the crack between the joints while in the pasty form.

When the joint is smoothed off by wiping, a permanent amalgamation is the result.

Problems Confronted in Metal Melting Require that Industrial Gas Man Possess Not Only a Knowledge of Gas Furnaces But of Metallurgy as Well

Arthur Forshaw, Chief Chemist of the British Firm of John Wright & Company, Discusses Various Phases of Metal Melting by Gas and Competing Fuels—Difficulties to be Guarded Against in Connection With This Practice in Recuperation of Gas and Air

No furnace has made greater strides in the last few years than the gas-fired crucible melting furnace, declared Arthur Forshaw, chief chemist for the British firm of John Wright & Company, in a paper recently presented before the Manchester and District Junior Gas Association. Although gas-fired crucible furnaces have been on the market for a number of years, it is safe to say that only within the last four or five years has gas-melting become a commercial proposition, and, indeed, gas melting as such has so far only touched the fringe of the business.

In a recent paper it was stated that the best pit-type coke-furnace melting brass has a thermal efficiency of about 5 per cent. Even this low figure is a great improvement on some of the earlier types of coke furnace. For instance, the old original square coke furnace had an efficiency in the neighborhood of 1 per cent. The usual way of rating coke furnaces is by the weight of fuel consumed, expressed as a percentage of the weight of metal melted. In the best pit-type of to-day this figure is about 30 per cent—*i. e.*, between 6 and 7 cwt. of coke per ton of brass; while in the original square type above mentioned it ran as high as 150 per cent.

Modern Coke Furnaces

In the most modern pit-type coke furnaces, when the lining requires renewing, the old one is chipped out and a complete lining in one piece inserted. In this way the furnace always starts with its new lining of the correct size. Several furnaces of this type are connected up to one common flue; the draught to each being controlled by the opening left for the purpose in the lining. Fuel consumption is reduced by the use of special bars which also allow of the easy withdrawal of clinker.

Without some special arrangement of this sort, bars become clinkered up, with the result that uneven burning of the fuel takes place. Nearly all the best pit furnaces are built square. This creates a sort of reservoir of fuel at the corners, and also allows any extra large lumps of coke to be raked into the corners without any liability of damaging the pot by forcing them down a circular combustion space of constant dimensions. Further, it allows of easier introduction of the tongs. These advantages have to be weighed against a slightly greater efficiency for round furnaces—providing the coke is graded properly. Such, in brief, are the coke pit furnaces against which gas has to make headway.

There remains, however, the coke tilting furnace; and these are dangerous competitors in their own way, for they attain a thermal efficiency of approximately 15 per cent—*i. e.*, they require only one-third of the coke needed by the pit-type to do the same work.

This leads me to a very important point, and one which I wish to emphasize. It is that we see far too much attention drawn to the consumption of fuel, and too little to other factors which enter into the melting of metals. It might be argued that as you are concerned in providing the fuel, this factor is of transcendent interest to you. This is true. But unless the apparatus to which you supply fuel is satisfactory in regard to the other factors, your market for fuel will soon disappear. It is, of course, the manufacturers of the gas-melting furnace to whom you must look for satisfactory apparatus; while he, on his part, must look to you for fuel which can compete with its rivals.

Furnace Linings

With regard to linings, we are faced with the fact that when furnaces come to be lined, the ordinary coke furnace costs less than the gas furnace, for the reason that in coke furnaces a lower class of refractory can be used than in gas furnaces.

In coke furnaces the bricks are in contact with the coke. They are also subject to corrosion from the ash, and to corrosion due to the continued rubbing of the coke as it passes down the combustion space, and, therefore, to enlargement of the latter.

But up to a certain point this does not matter much. It raises the fuel consumption somewhat; but in normal times coke is comparatively cheap.

In the gas furnace, on the other hand, the combustion space must be kept constant within narrow limits, or the consumption of comparatively costly fuel rises materially. All the time, however, unless care is taken, the lining of a gas furnace is subjected to the effects of any metal which may be spilt over the sides of the pot or during charging.

The action of such spilt metal is very destructive. The metal first oxidizes during the time the gas is off for the pouring, and the basic oxide produced afterwards attacks the acid brickwork, with resultant formation of slag. This, of course, increases the combustion space.

Selecting Linings

The linings should be selected with a view to resistance not only to heat, but also to slag corrosion.

Our experience is that most of the spilling of metal is due to careless stirring, and as it is too much to expect that this will ever be entirely cured, it is essential that the gas furnace be provided with means of removing any slag formed in this way. If it be not removed,

the corrosion of the remaining brickwork is much facilitated.

In a case where slagging was neglected, I have seen the slag form a pool reaching to a higher level than the top of the pot stand; while the shape of the furnace from cylindrical had become nearly spherical. Under such conditions, even if the burner be not interfered with, the gas consumption may easily double or treble itself.

Attack by slag on the linings is much accelerated by temperature, so that the higher the temperature at which the metal must be poured, the greater the care that must be exercised in trying to exclude spilt metal. There is another aspect of the spilt-metal question in relation to temperature that is of special importance to gas melting.

The Slag Difficulty

It has been the practice to try and get rid of the slag by leaving a hole in the lining at the bottom of the combustion space, communicating with a channel leading outside the furnace.

This arrangement, however, is useless. The slag formed is so viscous that it will with difficulty flow into the hole. If it does get there, it solidifies immediately it is out of actual contact with the flame, and the hole becomes blocked. The solidified slag must then be chipped out, and in the doing of this the hole becomes enlarged. In the result, the slag is not satisfactorily got rid of, the furnace lining is damaged by the chipping, and loss of heat occurs through the hole.

To improve on this, we introduced a furnace bottom consisting of two semi-circular iron doors hinged on the outside and closing on to a bridge. When open, the furnace had a full through-way into the pit, except for the bridge, and the slag could be knocked down from above while still hot.

The doors, before closing, were covered with fireclay. They were held in the shut position by means of iron wedges, which have to be knocked out from underneath before they could be again opened. When closed, the pot stand rested directly on the firebrick bridge, which in turn was supported by a cast-iron or steel strap—the pot, of course, resting on the stand. Sometimes the space betwen the stand and the furnace wall was filled with broken brickwork.

Since then, experience has shown that this method of holding the doors could be bettered, and our present pit furnaces have a wheel and shaft at the side. By turning the wheel, which projects above the floor level, the bottom can be dropped without going down into the pit to remove wedges. When it is closed, the wheel is kept in the correct position by means of a ratchet and pawl.

Life of Linings

We are often asked what life may reasonably be expected from a furnace lining, and we are bound to reply that "it depends."

It is, in the first place, difficult to get definite figures, for we are, as a rule, not in a position to follow the performance of a furnace in an outside foundry for a long enough time.

Sometimes one sees estimates of (say) six months or a year; but time in this connection conveys no meaning. We prefer to calculate on the number of melts obtained, and this will, of course, depend on the quality of brick.

The users should be guided by the furnace manufacturers in this matter. A figure of 500 melts for small pit furnaces melting gun metal or brass is not unreasonable, and with care there is no reason why this should not be as high as 800 melts, particularly for brass, while for aluminum it should be considerably more. The more often the lining is "fettled" the longer will it last.

Naturally, the quicker the rate of output, the greater wear and tear on linings. On the other hand, continuity in melting makes for economy, as every time the furnace is cooled down and reheated there is extra wear and tear of the linings.

It is well worth considering the expedient of paying furnace operators a bonus on the life of the linings.

This general question of getting large outputs at the expense of frequent renewals of plant has been discussed in connection with many different sorts of apparatus and machinery, and can only be decided after experience.

In general, it would appear that speeding up production pays, but each furnace must be specially designed for the particular purpose in view.

For instance, a cupro-nickel furnace is supplied with much increased burner power, and is more perfectly heat insulated, and such a furnace would not be economical to use for brass. On the other hand, a furnace designed for brass would hardly get cupro-nickel to a sufficiently high temperature, and, if it did, the general melting cost would be unnecessarily high.

Corrosion by Fluxes

A further cause of short life of pots is occasionally met with, and that is corrosion on the inside of the pot at the level of the molten metal. This is due to the action of fluxes. At present, it is a matter of controversy as to the exact reaction occurring, because some fluxes appear to attack gas-heated crucibles more than coke-heated ones, and others vice versa. At all events, the trouble is often met with, and is annoying, because, with the exception of a ring of corroded surface round the top inside, the pot in perfectly sound.

The only advice that can be given at the moment is to try the use of different fluxes, and to limit them to as small a quantity as is permissible; also to remember that a perfectly even flame of the correct quality seems to have a beneficial influence on this inside corrosion. Generally speaking, one finds each particular foundry has a favorite flux of its own, the most usual for brass and copper alloys being pearlash, flour spar, potassium sulphate, salt cake, common salt, nitre, argol, borax, glass, etc. Charcoal is much used—not, of course, as a flux, but as a preventive of oxidation.

Life of Crucibles

All these causes of failure in pots, with the exception of scaling, apply to coke-heated crucible furnaces no less than to gas-heated ones, and the question arises, after the presentation of such a formidable looking list, as to what life may be reasonably expected of the pots.

Naturally, this varies greatly with the metal being melted, and the usage to which they are subject.

Small pots last longer, as a rule, than large ones, and pots in tilting furnaces longer than those in pit furnaces—the life of the latter is shorter on account of their handling by the tongs.

To mention definite figures, I know one brass foundry where the average life of coke-fired (60-lb.) crucibles was about thirty to thirty-five melts—a figure which appears fairly to represent ordinary coke practice. For these people we installed a battery of 60-lb. pit-type air-blast crucible furnaces, and now they average eighty to ninety melts per pot.

In fact, I have seen pots after they have done 100 to 105, and even 110, melts that appeared good for several more melts, but had lost shape through the continual pressure of the tongs in pouring, and which were discarded solely for this reason. In another works, where our 300-lb. tilters are in use melting brass, this foundry regularly obtains 100 melts per pot, and the firm assures us, in spite of our original skepticism, that they have attained 196 melts per pot.

They have a good method—they pay the workmen a bonus on every melt per pot above a certain number.

It is only fair to say that in both the above cases high pouring temperatures are not necessary, and results like this could not be poured with gun metal and cartridge metal, which have to be poured at much higher temperatures.

In the melting of aluminum, on the other hand, a high figure should be obtained. Only a few days ago, in a works where we had installed several 600-lb. tilters, the foundry manager informed us that he was obtaining 150 melts per pot, and was very well satisfied with such a result.

One of the metals that causes the shortest life of pots is cupro-nickel. This alloy has to be raised to a temperature of approximately 137 deg. C. before pouring, and as the surface of the metal must be protected by flux, long life can hardly be looked for. In coke melting, using the 250-lb. size (pit type), the average life is four melts. In a large installation made by us, this size of pot is given an average of about fourteen melts per pot, while with the 60-lb. size an average of from eighteen to nineteen melts per pot is obtained.

Competent Labor Needed

Before leaving the matter of pots, I would say that a pot always seems to give longer life if it can be made to glaze over the outside. Glazing very often occurs without taking special steps to ensure it—in fact, it happens in a gas furnace when the setting of the burners and conditions generally are correct. But sometimes reagents, such as water-glass and the like, are painted on the outside of the pot before use. The glaze protects the graphite from oxidation. There is a further cause of damage to pots that should be noted, due to careless charging. If two cold ingots, for instance, be wedged together, they will expand as they heat, and often burst the pot or damage it severely.

Coke furnaces necessitate the storage and handling of fuel, the disposal of ashes and the reclamation of metal from them, while gas furnaces merely require the starting of a blower and the manipulation of two cocks. In the light of what I have already said with regard to the care of linings and crucibles, it will be understood that, to get satisfactory results, reasonable but constant vigilance on the part of the workmen is necessary.

The gas-fired crucible is a very satisfactory piece of apparatus when properly used. But just as one would not take an ordinary carter and make him one's motor-lorry driver without training him, so the labor employed on gas-fired crucibles requires some training and experience before it can get the best results from such plant, although the men may have had years of experience of coke-fired pots.

I find very often that such men are inclined to make difficulties. By long use the conduct of melting by coke and its precautions have become instinctive to them, and when they turn over to gas they have a different set of conditions to face, and must think before they act. This no doubt is not easy for them, and they are at first inclined to visit on the plant the failures which, as you see, are not due to it.

Consider for a moment if these men had been brought up to gas melting, and had been then required to turn over to coke melting, how much more irksome they would have found it!

After all, the coke furnace calls for more manual exertion, while the gas furnace saves this at the expense of a slight further call on the mental functions.

To give only one instance, how much hotter work it is removing a crucible from a coke furnace, still containing the incandescent fuel, than from a gas furnace where the fuel is turned off while pouring is in progress.

Our experience is that, after a time, the men get to like the gas furnace better than the coke furnace.

Gas Consumption for Melting

Having now briefly considered some of the points, due attention to which will promote the success of gas melting, we may pass on to consider actual fuel consumptions. As I have already remarked, this is the point to which exclusive attention is generally drawn. It is difficult to select figures which will correctly represent average practice. Some founders require their metal much hotter than others, and to quote figures which could not be substantiated for any particular operation is to court disappointment. It might be argued that one should quote figures for definite pouring temperatures, with the appropriate increase for definite increments of temperature, but the difficulty is that so very few founders know what their pouring temperature is. They know when they have attained it, but not its figure on the scale. Nor is this to be wondered at, seeing that the types of pyrometer for this particular work leave much to be desired.

Causes of Difference in Melting Figures

A cause of wide difference in melting figures for the same metal is the physical state at the commencement. To take gun metal—it may be put in the pot in the form of ingots of the alloy, and this will give the lowest possible melting figure. Very often, however, the alloy is prepared from its constituents. In this case, the copper is melted first, being put in the pot as ingots of virgin copper. It is fairly clear that, as the melting point of this metal is higher than that of the alloy, while the zinc and tin, or about 12 per cent of the whole, cannot be preheated on account of their low melting points, more gas will be required to make the alloy than to

melt it. The more finely divided the metal is, the more gas it requires to melt it. We usually find ingots are the easiest to melt. After them, heavy scrap like runners. In fact, between the two there is not much difference. Light scrap takes rather more gas, while swarf may need double, or often treble, the gas necessary for ingots. In general practice, apparently, mixed charges are fed indiscriminately, but from our experience we consider it best in gas practice to charge the lightest scrap first, the heavier next, finishing up with the heaviest.

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These improvements are due partly to design of the furnace and partly to the Wright-Brayshaw burner. This latter is so designed that it will give as nearly as possible a perfect mixture of gas and air and occasions an intense combustion, if required, by means of which very high temperatures may be obtained. Anyone familiar with gas-furnace work, will appreciate this when I say that by its means we are able to melt pure Mond nickel with perfect ease.

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There are, however, other results that require mention, and I will refer to them shortly. In practice, apart from laboratory tests, the use of an efficient preheater will often reduce the gas consumption by (roughly) one-third. It is necessary, however, to ensure that should some parts of the metal be heated more than others, and run at the edges, as often happens, these small amounts of molten metal should be directed into the pot, otherwise they lodge in the preheater or run down the furnace linings with the same result in each case—corrosion of the brickwork.

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preheating must be carried to a high temperature. For instance, 1 cu. ft. of air raised from ordinary temperature to 1,000 deg. C, contains, roughly speaking (and disregarding any increase of specific heat at high temperatures), 35 B.t.u., and further occupies, when heated to that temperature, four to five times its original volume.

It will be at once apparent that for a given pressure a jet which, starting cold, will pass the correct quantity of air, will be inadequate when the temperature is raised by recuperation. The same reasoning applies to the gas.

In an ordinary burner, then, where the injection of gas by air is relied on for obtaining and maintaining the correct mixture, the conditions of equilibrium are considerably upset if one or other constituents be preheated, and if both be preheated to the same degree, special precautions have to be taken to ensure the requisite volume at all states of the preheating. Another consequence of the low specific heat is that the exposure to an environment at lower temperature of even a few inches of the pipes conveying the preheated gas or air will cool down the gas or air with loss of practically all the heat that has been imparted to them.

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Another consideration is worth mentioning. When iron is exposed to the action of gas or air or products of combustion at high temperatures, it suffers rapid deterioration. As a result of this, advantage cannot be taken of the full temperature to which recuperation might otherwise be carried.

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Copper is a metal that is easily oxidized. It forms not only the black oxide CuO, with the appearance of which we are all familiar, but also the reddish cuprous oxide Cu_2O, and it has the curious property of forming a well-defined series of alloys with this its own oxide.

It is stated that in copper itself, unless the amount of Cu_2O present exceeds 2.25 per cent (equivalent to 0.25 per cent of oxygen), it is not injurious, and, in fact, copper from which all traces of oxygen have been removed—*i. e.*, overpoled copper—is incapable of being worked.

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Where the zinc does not remove all the oxygen, it means that when the tin is afterwards added to the oxide of this metal SnO_2 is formed, and it has two deleterious effects. Firstly, the tin oxide is very infusible, and forms a pasty mass even at temperatures so high that nothing can be seen in the furnace by the naked eye, and if the metal be then poured portions of this oxide are trapped in the castings, rendering them unsound. Secondly, the tin thus used up to make oxide prevents the alloy from being of the correct composition to give the requisite mechanical properties.

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met with, and one is driven to the conclusion that local conditions are responsible, by which I mean the original brand of virgin metal used, flux, gas quality and manipulation generally.

The problems as they confront one are intensely interesting, and I think I have said enough to indicate that to tackle them—as the gas-furnace exponent is bound to do, for any fault is always attributed to the furnace—requires not only a knowledge of gas furnaces, but of metallurgy as well.

A case such as I have outlined above was proved to be curable by poling, which is tedious and arduous, or (alternatively) by adding phosphor copper in the correct quantity—the phosphorus, with its well-known avidity for oxygen, removing the latter with formation of the oxide of phosphorus. It must be again noted that the use of such expedients requires judgment—an excess of phosphorus would be as bad as the original fault.

Before leaving this part of the subject, another influence that may alter the mechanical properties of the alloy must be mentioned. I refer to the pouring temperature. I have already stated that Admiralty gun metal must show a tensile strength of at least 14 tons per square inch, and an elongation of 7.5 per cent. These figures can be readily obtained, but they may be greatly modified by the casting temperature.

As the judging of temperature by the eye is somewhat different in gas furnaces compared with coke furnaces, it is easy for the inexperienced workman to spoil the metal before he becomes accustomed to the altered appearance.

Possible 100 Per Cent Increase in Output One of Advantages of Gas Over Coke for Brass Melting

Cut Lining Due to Melted Metal Coming in Contact with it—High Temperature in Itself No Menace to Linings

One of the points in favor of gas melting, as compared with coke, is the possibility of increased output by the former for a given size of plant. This increase may be a very substantial one and amount in some cases to 100 per cent, though more frequently it will be found to range from 50 per cent upwards, declared Arthur Forshaw, chief chemist for John Wright & Company, Birmingham, England, in a paper read before the Manchester and District Junior Gas Association, Nov. 2.

Parenthetically, it may be pointed out that increased rate of output means that to reach a given figure, less plant is required, and therefore less capital outlay.

To obtain this increase, however, necessitates, among other things, raising the temperature of the combustion space, because the increased flow of heat necessary through the walls of the pot to obtain the output is, of course, made possible by what I may call an increased "head" of heat—*i. e.*, higher temperature—and so again the greater the output the greater the care that must be taken to exclude spilt metal.

That temperature itself is not sufficient to damage our linings we proved by running one of our large "Lip-axis" tilters without any metal in the pot for a week continuously—stopping only for short periods to represent the ends of the normal shifts.

Under these conditions, the temperature was raised very much above anything that would be experienced in practice. The lining, on examination, proved to be in practically the same condition as at the start of the test, and quite without signs of fusion or running, except in one place, which was not due to failure to withstand the temperature, and which made the experiment still more valuable—viz., a small piece of iron lodged on the brickwork melted by accident.

At the high temperature of the furnace, this had run down the furnace wall and cut a channel in the surface of the lining right from the top to the bottom, where it had finished up in the form of slag.

Factors That Make for Efficiency in Gas Main Welding

M. S. Clark Supplies Data in Regard to Carrying on This Class of Work—Some Practical Considerations

A 100-lb. drum of calcium carbide will produce enough acetylene to operate two welding torches for ten hours in ordinary pipe work, declared M. S. Clark, in his paper on "Oxwelding in Gas Main Construction," presented at the annual meeting of the Texas Gas Association.

The use of the process has become so widespread that oxygen is produced all over the United States and furnished to consumers in cylinders containing 200 ft. each. Three cylinders contain sufficient oxygen to operate two blowpipes for about ten hours.

Long lengths of hose, leading from the generator and from the oxygen cylinders, enable as many as six welders to work from a single unit. The cost of such a unit equipped to furnish the gas supply to two operators is approximately $650.

In cases where the extent of the welding is not such as to justify a company in making as large an investment in apparatus, a small two-wheeled truck designed to carry one oxygen tank and one acetylene tank, furnishing gas to one operator, is frequently used. In this case the acetylene is supplied in tanks containing approximately 300 ft., sufficient to supply one operator acetylene for ten hours' work. The cost of such a unit is approximately $175.

While the original investment is considerably smaller, the difference is soon absorbed by reason of the fact that the generator produces acetylene at a cost of approximately 1 cent per cubic foot, and eliminates the transportation expenses incident to refill and exchange of tanks. Whereas, the cost of acetylene gas furnished in tanks ranges from 2½ to 3 cents per cubic foot when handling charges are taken into consideration.

Importance of Instruction

Facilities for the instruction of employees in the art of welding are offered by the larger manufacturers of apparatus. The employees may either go to the welding school conducted by such manufacturers, there to learn the art of welding, or the services of an expert may be secured at a nominal charge for the purpose of instructing the purchasers' employees on the ground. The welding of pipe is one of the simplest applications of the process. A man of ordinary intelligence can become proficient with a few hours' instruction and prac-

tice. Let me urge any of you who contemplate adopting the process to avail yourselves of the opportunities for instruction which are offered.

Pipe can be secured from the mills either in random lengths or in 40-ft. lengths. We recommend the use of 40-ft. lengths, if obtainable, to reduce the number of joints to be welded, thereby affecting a corresponding reduction in welding costs. The mills will furnish all sizes of pipe in any lengths up to 40 ft. with bevelled ends without extra cost.

By butting two lengths of pipe with bevelled ends, a "V" groove is formed at the joints, enabling the operator to more easily penetrate the entire thickness of the wall, and at the same time facilitate a complete and proper fusion of both sections with the filling wire, which he adds. In cases where the ends of the pipe are square cut, the sections are butted up to within 1/16 to ¼ in. of each other, depending upon the size of the pipe and thickness of the wall.

Sections up to 1,000 ft. or more in length are welded together on the surface of the ground, and when completed dropped into the trench.

It is obviously desirable to dig as long a ditch as consistent, in order that long sections of pipe may be dropped in and the number of joints to be welded in the ditch reduced to a minimum. At such joints a ball is dug sufficiently large to enable the operator to make the weld in the trench by welding all the way around the pipe.

The grading of the ditch must be observed as carefully as in the case of Dresser couplings or thread connections to avoid low spots, but no particular care need be taken to have the pipe straight in the ditch; in fact, the more snake-like the pipe is laid the better, for in this way expansion and contraction are taken care of. Experience has demonstrated that because of the great strength and flexibility of the oxy-acetylene weld, no other provisions to take care of expansion and contraction are necessary.

The best and most economical way of laying down the pipe preparatory to welding is on 2 x 4's or other timber at the side of the ditch. The pipe should be placed ends butting for the welder, who is assisted by two helpers working at each end of the section, who turn the pipe with chamtongs, or other devices, so that the operator is always welding at the top of the pipe, as position in which the fastest work can be accomplished.

While many follow the method above described for all sizes of pipe, some engineers weld the larger sizes, 8, 10, 12, 16 and 20-in. pipe when supported from skids directly above the ditch. In this way, two operators can work on opposite sides of the pipe, which is turned by the helpers as rapidly as the work progresses. As fast as the welded section of pipe is finished, it is capped at both ends and tested for leaks at the desired pressure. After it has been tested, it is lowered into the ditch and welded to the main already laid. At such points in the ditch, a bell hole is dug of sufficient size to allow the operator to weld entirely around the joint, as described above.

What Can Be Accomplished

Aside from the enormous strength and efficiency of the welded joint compared with the mechanical forms of couplings, the new process is considerably more economical in installation cost. It has been demonstrated that welded joints can be made at a cost of from 25 to 60 per cent less than the cost of purchasing connecting recessed screw couplings, while the economy is considerably greater in comparison with insulated couplings. On a line laid in a very rough and mountainous country, the following cost per joint based on labor at 35 cents per hour may be considered as a fair average for welded joints; 4-in., $0.24; 6-in., $0.39; 8-in., $0.58; 12-in., $1.57; 16-in., $2.84.

It has been found that an average welder can complete from ten to thirteen joints per hour in 2-in. pipe, three and a half to four and a half joints in 4-in. pipe, three joints in 6-in. pipe. The welding of a joint on 8-in. pipe takes from thirty to forty minutes, on 12-in. pipe one hour, and in the case of 16-in. pipe one hour and a half. Where laterals are required, a hole of the proper size is cut in the main with a cutting blowpipe and the lateral is welded into place at an angle desired. In the manufacture and installation of special fittings, the welding process is in a class by itself.

As a Protection Against Electrolysis

The number of bends in a welded main is less than in the case of screw or Dresser couplings, inasmuch as the pipe can be cut at any point and welded at any desired angle. When a bend is necessary, the usual methods can be employed. A long radius bend can be safely made in any section of pipe after it has been welded without any injury whatever to the welded joint. Laterals or service lines can be cut into the main by welding a short nipple thereto. The main can then be tapped through the valve installed on the end of the nipple, or a welded tee can be inserted in the main. The upright arm of the tee is threaded, and after tapping is closed with a cap. A bag hole may be welded up in the main by supporting a 4-ft. piece of 6 or 8-in. pipe a few inches over the hole, so that the flame is carried away from the operator. The welded line in the city is a preventative of damage, due to electrolysis. It has been found by test that the action is distributed over the entire length of the welded main rather than concentrated at any one point.

Decline in Beehive Coke Output—Due in a Measure to Lack of Cars

A sharp decline in the ratio of tonnage produced to capacity was reported during the week of Dec. 1 by representative beehive coke producers in the Connellsville, Greensburg and Latrobe districts of Pennsylvania. Fifty-eight operations reported a production of 273,910 net tons, 62 per cent of their combined capacity as rated by the railroads. The unusually high losses were attributed not to the effect of the Thanksgiving holiday, but to the lack of coke cars; losses due to this cause rose from 15.6 per cent in the preceding week to 23.5 per cent of the rated capacity. Losses due to shortage of yard labor were reported as 9.3 per cent.

Sandusky Company Stops Mailing of Bills

Owing to the new Governmental regulations requiring two-cent postage on postal cards, the Sandusky Gas & Electric Company has discontinued the sending of gas and electric bills through the mails.

Cards are now printed and are distributed by meter readers, thereby effecting a saving of approximately $150 per month.

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Gas Conservation

Gas companies at one period were indifferent as to the proportion of their product that consumers paid for that was wasted. This period passed with the general acceptance of the Welsbach mantle. The alert gas company of to-day is very much interested in the amount of service the consumer receives from the gas he burns. Many have gone to considerable expense to reduce the amount of gas per appliance in use that the consumer pays for.

Nevertheless, even with the most progressive company in this respect, no one cherishes any delusions in regard to the fact that a very large part of the gas that passes through the consumers' burners is wasted.

To eliminate this waste would under normal circumstances represent a tremendous expense. Its source lies in that vast part of the community that will not concern itself in the least with so small an item of expenditure as the gas bill; that part which, in many cases, has made request maintenance a failure because it would rather go on using a poorly adjusted and frequently defective appliance rather than take the trouble to call the company's attention to it; the part that never goes near the gas company offices to pay its bill, but pays it to a collector at the door or by check.

This is the class that lights the giant burner on the range full blast to start the contents of a 4-in. cooking vessel boiling, realizing full well that the flames outside the vessel's bottom area are simply serving to heat the surrounding air, but is not concerned in the slightest over the fact because it knows that wastefully though it uses it the gas bill cannot become an important item in its monthly expense.

The only way this class can be reached is by house-to-house canvass by demonstrators. It will not bestir itself to seek information on saving gas. Information in this regard must be served to it on a golden plater.

Even this course does not promise complete success. The demonstrator will in very many cases be refused admission to the premises.

This very large class—and its membership is not limited to the wealthy—carries its indifference to small items of expense to seemingly strange extremes.

Yet every thousand cubic feet of gas thus wasted—and in the aggregate there are many—means so much coal that must be replaced in the national fuel supply, means a relative hampering of the industries, paves the way to military setbacks abroad and shivering, hardships and deaths at home.

The problem of educating consumers in the economical use of gas becomes more than a concern of the gas companies. It becomes a national concern.

Because thousands of volunteer workers canvassed their neighborhoods soliciting signatures to food conservation cards, thousands of families that otherwise

would not have been reached are observing food conservation practices. Why should not a similar volunteer body be organized to learn economical methods of using gas, and, in turn, canvass their neighborhoods teaching it to housekeepers?

Such a plan should have the sanction—in fact, should have its inception—in the office of the National Fuel Controller. A considerable weight was given to the solicitations of the food conservationists through the words: "I represent the United States Government." Canvassing demonstrators with such authority behind them would be insured admittance which to the gas company's employee would be denied.

The success of such a plan would save to consumers additional sums to be contributed to patriotic purposes or invested in Government loans, would give to the gas companies a free balance of gas to supply some of the house-heating and industrial business that is almost pleading to be taken on to the lines, and release in effect to the constructive use of the nation vast tonnages of coal that are now being indirectly wasted. And coal rivals wheat in the necessity of making each pound serve its maximum purpose.

Increased Efforts in Merchandising to Help Out in Company Financing

Getting capital by simply walking in to the bank and leaving a short-time note behind is not practiced these days to the extent it was a very short time ago. In fact, getting the funds to supply current needs has become very much of a problem in the gas field.

Some companies are solving it to a degree by reducing the unpaid balance by means of bonuses to employees. Others have adopted the short-sighted policy of holding back on purchases of appliances, figuring thus to reduce the amount of the bills that have to be met.

This latter policy is somewhat akin to a policy of killing the goose that lays the golden eggs, and arises from a narrowness of vision that is scarcely understandable. Merchandising as we have carried it out has been to a very considerable extent on the instalment plan. Those who do not possess the faculty of seeing much beyond their own noses cannot apparently conceive of any other means of selling appliances, and this means, of course, involves on the part of the gas company a considerable unpaid balance, increasing constantly in proportion to increased sales.

But a great many appliances have been sold in the past on a cash basis, and there is little reason to doubt that with more intensive selling efforts we could discontinue the instalment plan altogether and lose little by it—at least, under present conditions.

The field for merchandising efforts is now unusually broad. Thousands who previously could not be reckoned as gas appliance prospects have become the very best prospects the gas merchandiser would want. They have neither used gas or electricity hitherto. Kerosene has been their illuminant. Now their earnings are exceeding their wildest expectations. They are going in for the luxuries. The phonograph interests have sensed this new market. By developing it the gas merchandiser could help solve his company's financing problems.

Rounding Off the Rough Edges of Human Progress

A vast amount of discussion is given to the subject of removing statues that are inartistic or set in inharmonious surroundings from our city streets and parks, the object being not to harass our optical sensibilities with sights that affect them adversely.

The plain man finds himself sufficiently interested in these discussions to journey forth to view some of the so-styled, and perhaps justly, monstrosities that make our cities horrible to the vision.

He looks and looks, but somehow cannot find anything noticeably repellant in the mass of masonry before him.

Then he turns about to journey home. He is delayed at the crossing to permit a cart to pass.

It is covered with hanging canvas curtains.

There is a breeze. Under its influence one of the curtains flaps upwards.

There is revealed to his vision, and perhaps to his nostrils, a miscellaneous collection of garbage.

Not only are his optical sensibilities jarred, but his olfactoric sensibilities as well.

But he is thinking of the monument. His mind does not register and remember this unpleasant moment in his day's experience. Being a plain man he does not wonder at the usual.

The continuance of the garbage cart represents one of the rough edges that exist in human progress. Doubtless that cart had traveled several miles through the city's streets, past children at play, preceding by a few feet, in a moment of traffic congestion, an open carriage in which some convalescent is out for an airing, close by the eyes and nostrils of hundreds of other plain men.

Its load was collected through several stops. A human being raised several large cans and dumped them to make up its contents.

Possibly a fragment from each dropped on the roadway or sidewalk on each occasion, to continue in its process of decomposition, affording in the meantime a feeding place for hundreds of disease-breeding flies.

And, truly, even the Appian Way could not be beautiful if it were a principal route of travel for the city's garbage carts.

The solution of the problem is simple—home incineration. An incinerator in every dwelling, or, in the

case of apartment dwellings, possibly one central plant in the building for all its inhabitants.

Following such a method handling the garbage would not be a repugnant task. It would be destroyed before decomposition, consequently offensiveness, had set in.

But how can a condition so idealistic be brought about?

Truly the gas industry is an unimaginative body. It can learn a great deal from those gas-device inventors who visit this office with such frequency.

These worthy citizens cherish a supreme confidence in the fact that their minds have given birth to a device from which all humanity would benefit if it was generally adopted. Most of them have already confided their beliefs to some unsympathetic gas company representatives, who have failed to be influenced by this supreme confidence. They put the device to some mechanical tests then turned it down.

"I am in touch with this or that body," our inventor tells us. "I expect it will get behind and push through some legislation which will make the adoption of my device compulsory by gas companies."

There was once a time when we considered it worth the effort to try to enlighten these worthy gentry, but we have given it up. The confidence they repose in the value of their devices is unassailable.

But the word legislation sticks in the mind. Gas companies are chary about employing this lever. Their tendency is to keep as far distant from it as possible. Too frequently have they become familiar with it from the receiving end.

But legislation is the only means by which the garbage cart will be eliminated through home incineration.

Until it is the householder who installs an incinerator is paying a larger portion of the general expense of the city than his proper share. He is a good citizen, and the health of his family is better insured than that of his neighbor, but the thought that one is paying the other fellow's bill is always galling.

It is not to be expected that without considerable educational publicity the general public is going to get enthusiastically behind any legislative measure that will compel home garbage incineration. It will ask why it should demand a law that will make it pay for something it now gets for nothing.

It does not get its garbage disposed of for nothing, of course, but it pays for it indirectly; consequently, does not fully realize it pays for it at all. Home incineration will necessitate its paying a large part of the bill directly.

But the AMERICAN GAS ENGINEERING JOURNAL believes home incineration of garbage would be a big step forward in civic progress. It does not believe this because it is, in a way, the voice of the gas industry, and home incineration would increase vastly the consumption of gas, but because it is primarily an engineering journal and is interested just as much in the general welfare of the cities it reaches as it is in the welfare of the gas companies they support.

How the Gas Companies are Helping the Nation

THE CONSOLIDATED GAS COMPANY, of New York, employees have responded rapidly to the nation's call. They now have 417 employees stationed in different branches of the service. The following names are among those on their Honor Roll:

Arthur A. Ackerman... Naval Militia
John Adams..... National Army
George Aichler..... National Army
Otto Albert..... Navy
Joseph Allen..... 69th Infantry, New York

A. Alsing..... National Army
E. Anderson..... National Army
A. Atkinson..... Naval Reserve
Frank Austin..... Army
Elbert Bagley..... Officers' Reserve

Hugh Bagley..... 14th Infantry, New York
M. Bambrick.....
Joseph Barden..... Navy
G. P. Barnitz..... 23d Infantry, New York
J. Barrett..... Regular Army

E. F. Bayer, Jr..... At Camp Dix
John Berke..... National Army
John Bergold..... National Army
Frank Beck..... National Army
George Beck..... 8th Coast Artillery

C. Becker..... National Army
F. D. Beckett..... Navy
Raymond Bennett..... National Army
R. Benson..... Aviation
Andrew Bergman..... Naval Reserves

Oswald F. Bergman..... Naval Reserves
George Beyer..... 95th Aero Squad
L. Bielemeier..... Army
C. H. Billings, Jr..... 71st Infantry, New York
J. Bizonski..... 2d Infantry, New Jersey

Edward Blauvelt..... 22d Engineers
J. A. Boffa..... National Army
William Boone..... 15th Infantry, New York
H. A. Boults..... National Army
Samuel Bowker..... 12th Infantry, New York

D. Braco..... National Army
R. C. Braun..... National Army
E. Brenner..... Navy
F. Breisacher..... National Army
Arthur Bromback..... National Army

R. Bronder..... Navy
H. Brown..... Naval Reserve
James J. Buckley, Jr... Navy
Thomas Burke..... National Army
A. Busse..... 9th Coast Defense, New York

S. Buttecavoli.....
A. J. Calahan.....71st Infantry, New York
Albert Carlson.....5th Infantry, New Jersey
T. Carmody.....7th Infantry, New York
F. Carono.....Navy

W. Carpenter.....National Army
William Cassidy.....69th Infantry, New York
F. Casey.....22d Engineers, New York
H. Cassidy.....Regular Army
W. Chamberlain.....71st Infantry, New York

J. Clendenning.....National Army
Joseph Cifka.....Naval Reserve
K. Collins.....Navy
M. A. Combs.....Engineer Officers' Reserve
J. Corcoran.....9th Coast Defense, New York

J. Cosgrove.....8th Coast Defense, New York
F. J. Cotton.....Canadian Expeditionary Force
M. Crystal.....71st Infantry, New York
J. Cummings.....Regular Army
J. Cuomo.....7th Coast Defense, New York

John Currie.....69th Infantry, New York
William L. Custer.....Infantry
W. H. Darcy.....National Army
James D'Amato.....10th Infantry, New York
G. Davison.....Navy

Vincent Dazio.....National Army
Frederick De Figaniere.2d Field Artillery, New York
H. A. Demarest.....2d Field Artillery, New York
H. L. Denninger.....National Army
C. A. Dempsey.....Navy

THE GUTHRIE GAS LIGHT, FUEL & IMPROVEMENT COMPANY, of Guthrie, Okla., and its employees have contributed $1,000 toward the war funds, such as Y. M. C. A., Liberty Loan and Red Cross. W. J. Dibbens is vice-president and manager of the company.

HENRY N. WOODSON, formerly with the Kansas City Gas Company, of Kansas City, Mo., received his commission as first lieutenant of infantry, Officers Reserve Corps, at Fort Sheridan, Ill., Nov. 27, and is now at his home in Kansas City for a short rest. After Dec. 15 he will be located at Camp Lee, Petersburg, Va. The Kansas City Gas Company now has twelve of its employees in the U. S. service, two officers and ten enlisted men.

H. M. BYLLESBY & COMPANY and operating companies subscribed $601,550 to the second issue of the Liberty Bonds; the employees' subscriptions amounted to $216,200, making a total of $817,750. The Oklahoma Gas & Electric Company, of El Reno, has a noteworthy record, in that every employee subscribed for one or more bonds.

J. C. AARON, formerly a collector with the Bristol Gas & Electric Company, of Bristol, Tenn., is now with the National Army.

THE SPOKANE GAS & FUEL COMPANY, of Spokane, Kan., has twelve of its employees in the national service, among them being the following:

Lloyd Allen, Com. Dept. Officers' Train. Camp, Presidio, Cal.
W. C. McWilliams,
Commercial Dept...U. S. Navy
Royce Richardson,
Chief Clerk.....Ordnance Dept., Watervliet, N. Y.
J. M. Scott, Mant. Man..Brementon, Wash.
P. B. Taylor, Com. Dept. Ordnance Dept., American Lake, Wash.

GEORGE W. RUPPERT, recently employed by the Improved Equipment Company, of New York, as draftsman, is now acting sergeant at Camp Upton, N. Y.

THE EMPIRE GAS & FUEL COMPANY, of Bartlesville, Okla., has quite a number of its employees now in active service, among them being:

H. P. Hopkins.....Assist. Chemist..165th Depot Brigade
L. W. Petree.....Geologist.....Aviation Corps
Earl W. Hunter.....Cadet.....National Army

W. C. MCGAMMON, orderly with the 105th Trench Mortar Battery, at Camp Sevier, Greenville, S. C., was formerly employed by the Knoxville Gas Company, of Knoxville, Tenn.

THE PEOPLES GAS LIGHT & COKE COMPANY, of Chicago, Ill., in a compilation just completed, shows that 208 of their employees have gone from the offices and workshops.

GEORGE B. CORTELYOU, president of the Consolidated Gas Company, of New York, has been appointed a member of the War Savings Organization Committee for Greater New York

THE UNITED GAS IMPROVEMENT COMPANY, of Philadelphia, in addition to the names of employees in active service published in previous issues, also have the following employees enlisted from their distribution department:

Frank E. Amrhine.....Company A, 3rd N. J. Infantry
Wm. A. Baker .....Battery F, 2nd Pa. Artillery
Samuel Bell.....B. G., 6th Infantry, Company M.
Walter T. Bilson.....Ordnance Reserve Corps
Stephen J. Bolger.....Battery F, 2nd Pa. Artillery

Albert Borman.....U. S. Navy
John J. Bower.....Battery B, 2nd Pa. Artillery
Warren E. Boyer.....Battery F, 2nd Pa. Artillery
James Brooks.....Headquarters Co., 2nd Pa. Artillery
H. G. Brown.....Pa. Unit Base Hospital

John E. Brown.....Camp Meade
William Brown.....Camp Meade
Herbert M. Burns.....Camp Meade

Vance L. Bushnell.....U. S. Aviation Corps
J. Cancello.....Camp Meade

Wm. L. Carlin.....Company E, 1st Pa. Engineers
Mike Carmin.....Camp Meade
James Casey.....U. S. Army
Frank Cavanaugh.....Battery F, 2nd Pa. Artillery
Colby H. Chester.....Camp Meade

Geo. L. Churchill.....San. Det., 3rd Pa. Infantry
Theodore Clay.....Battery F, 2nd Pa. Artillery
R. Connors.....Camp Meade
Carmese Cordeso.....Camp Meade
Charles Croke.....Battery F, 2nd Pa. Artillery

W. Russell Crosdale....Quartermaster's Enlisted Res. Corps
Nick Delanzo.....Camp Meade
Edwin W. Denzler, Jr...U. S. Marine Corps Reserves
H. A. Diacount.....U. S. Coast Guard
John J. Dietz.....Ordnance Reserve Corps

John C. Dorsey.....Unknown
Eben Dunn.....Battery F, 2nd Pa. Artillery
Arthur A. Dysart.....U. S. Marine Corps
John Erdlen.....Camp Meade
Robert Faulkner.....Army Reserve Ambulance Corps

S. Fine.....Company G, 1st Pa. Infantry
Benjamin Freeman.....Company M, 1st Pa. Infantry
Francis B. Gallagher....U. S. Army
Robert L. Gangwisch...Camp Meade
Joseph W. Greisser.....Company L, 6th Pa. Infantry

Clarence E. Hasey.....Engineer Reserve Corps
Henry L. Hayden.....Company I, 6th Pa. Infantry
R. C. Hohl.....Company E, 1st Pa. Engineers
John Hollins.....Engineers' Corps
H. J. Hushwood.....Wrightstown, N. J. (Camp Dix)

William E. Imhoff.....Company C, 1st Pa. Infantry
Thompson J. Irving....Battery E, 2nd Pa. Artillery
Richard Jackson.....Infantry
Harry V. Jacoby.....Company D, 1st Pa. Infantry
Carl Kehoe.....Camp Meade

William Keller.....Battery F, 2nd Pa. Artillery
Daniel Kelly.....Navy
Harry J. Kelly.....Band, 3rd, Pa. Infantry
James E. Kenney.....Company I, 1st Pa. Infantry
Isaac A. Kent.....U. S. Navy

Charles Kettelberger....Battery F, 2nd Pa. Artillery
Thomas Langdon.....Camp Meade
Harry Latham.....Naval Reserve Force
Harry S. Lewis.....U. S. Navy
John Linaka.....San. Det., 3rd Pa. Infantry

Harry Linaka.....Battery F, 2nd Pa. Artillery
John Lodies.....U. S. Artillery
Alfred H. Loney.....Troop G, 1st Pa. Cavalry
Tony Ludovici.....Camp Meade
Horace Lutz.....Quartermaster's Department

William F. Maginnis....U. S. Aviation Corps
Clarence E. Masey.....9th Regiment, Engineers' Reserve
G. I. Maxwell.....Camp Dix
L. G. Meder.....Camp Meade
Herbert Miller.....Company L, 6th Pa. Infantry

Rufus Minnigh.....Quartermaster's Department
Charles Moeller.....Camp Meade

John Muran.....Camp Meade
Karl Muschette.....Company A, 3rd Pa. Infantry
P. McAnany.....Camp Meade
John McCarty.....Battery F, 2nd Pa. Artillery
James McGarvey.....Battery F, 2nd Pa. Artillery
John J. McGlinche.....U. S. Marine Corps
Joseph F. McGuire.....Naval Coast Defense Reserve Force
James McHale.....Quartermaster's Corps

John McMenamin.....U. S. Army
Frank H. McNeil.....Company L, 6th Pa. Infantry
Raymond McVey.....U. S. Field Artillery
Joseph Neiss.....Company L, 1st Pa. Infantry
John Noon.....Camp Meade

Frank Norcross.....San. Det., 3rd Pa. Infantry
Wm. Norton.....Company A, 3rd N. J. Infantry
H. W. Oelkrug.....Battery F, 2nd Pa. Artillery
Elmer E. Patterson, Jr.Company C, 1st Pa. Infantry
Joseph Pedano.....Naval Reserves

Louis Peterson.....Navy
Ralph Petrone.....4th Va. Artillery Band
R. J. Poehlman, Jr.....Camp Meade
N. Porcelli.....Camp Meade
Walter C. Reed.....Battery A, 2nd Pa. Artillery

Edw. J. Reggan.....Company M, 6th Pa. Infantry
Philip Reiss.....U. S. Army
J. Roberts.....Naval Reserve Force
Clarence Rodgers.....Cavalry
Philip S. Rodgers.....Camp Meade

Richard B. Ross.....Battery C, 2nd Pa. Artillery
Nicholas Rubina.....3rd Pa. Infantry
Frederick Russell.....Engineers
Joseph Sandet.....U. S. Army
Park Seigel.....Naval Reserve Force

James Shertz.....Company M, 28th Regt. U. S. Infantry
Edw. Skowakers.....Company M, 1st Pa. Infantry
E. A. Smith.....Company F, 3rd Pa. Infantry
James Smith.....Camp Meade
Mark Smith.....Camp Meade

W. G. Smith.....Camp Meade
William Sticher.....U. S. Navy
Edward T. Swope.....U. S. Navy
Charles C. Taunton.....U. S. Navy
William Truax.....Naval Coast Defense Reserve Force

Raymond Vanaman.....U. S. Navy
Robert M. Waddington..Naval Coast Defense Reserve Force
Wm. Wakely.....Navy
Morris Wallace.....U. S. Navy
Thos. J. Wark.....U. S. Infantry, Fort Slocum, N. Y.

Paul Webster.....U. S. Cavalry
John Whinney.....Engineers
Emil Wipf.....Camp Meade
Harry B. Wood, Jr.....Camp Meade
John C. Zimmerman....Battery A, 2nd Pa. Artillery
Louis Zockoli.....Camp Meade

GEORGE H. HARRIES, of the Byllesby organization, who has been brigadier general in charge of the 59th Depot Brigade at Camp Cody, Deming, N. M., for the last several months, has been transferred to Camp Jackson, Columbus, S. C., in command of the 186th Infantry Brigade.

Merchandising Gas

Display in Itself, No Matter How Good, Will Not Make Sales

A recent trip made by a representative of the general office of the Public Service Gas Company of New Jersey to the various districts brought out the reason for the apparent lack of sales of ironing machines and washing machines in many offices in its territory.

When the general office representative asked to see the agent, he was informed that the agent was out, but would return shortly. The representative then seated himself in close proximity to the display of an ironing machine and clothes washer. This particular display occupied a very prominent place near the door, where everyone entering or leaving would be sure to see it, but although dozens of people passed it while he sat there, no one stopped to look at the display or appeared to be at all interested.

When the agent returned, the general office representative found that they had not sold an ironing machine or a washer for over two weeks, that since then they had secured only two or three live prospects, and that the only effort they made to create sales for these appliances was to send out circulars at wide intervals, and having them displayed on the floor.

The general office representative then told of his experience watching the people walk past the floor display, and asked the agent why he did not have his sales force talk washers and ironers to every customer that came in. His point was that no matter what a woman bought, even if it was only a Welsbach mantle, her attention should be called to the home laundry machines. In other words, the floor display in itself would not make the sales, and it was necessary, in order to get the value out of the floor space, to get people to come to the machines and give them a little demonstration and sales talk.

The result of this conversation was a meeting of the sales organization, at which the entire matter was thoroughly covered, and each man and woman was instructed to keep a careful record of the people who were interested so they could be followed up.

The plan went into effect the next morning, and when a check-up was made at the close of business that day, it was found that two washers and one ironer had been sold and that six live prospects for washers and four for ironers had been secured.

A display in itself, no matter how good it may be, will not make sales. You must call your customers' attention to the appliances on your floor—you must show them how they work—that they will save time, labor, money and clothes—to make the sales and get the live leads which can be developed into sales by the proper follow-up.—*Service.*

Going After High Revenue Return Producing Business to Help Over High Fuel Cost Period

In the Dec. 8 issue of the *Electrical World,* Thomas Robson Hay, after explaining the situation central stations are faced with, suggests that the present is an opportune time to redouble efforts to increase the sale of electricity for house lighting and for the operation of the various appliances that are on the market.

"Such business," he asserts, "has a high revenue return and will in many cases act not only to increase the net return from all connected business, but will be also an active agent in further popularizing the use of electricity, especially among the laboring classes, who are now earning more than ever before and consequently have more to spend."

In order to secure this business, he points out, the prospective customer must be convinced that he will be justified in making the expenditures and that the expenditures once made will be a good investment. He outlines four means of accomplishing this: Attractive and appealing publicity; intelligent solicitation; delivery of goods as advertised, and service.

Perhaps the most effective way of advertising is by means of newspapers. The copy ought to be attractive and informing. To be effective it must be well written, truthful as to statement of fact, and, when illustrated, the cuts must be vitalized with action and suggestion—not stereotyped by the use of uninteresting illustrations lacking any suggestion of comfort, convenience and utility. Too little printed copy is better than too much. Technical expressions are better eliminated, for always must the public that it is especially desired to reach be kept in mind.

Systematic Solicitation

Intelligent solicitation means, first of all, preparing and mapping out a fairly definite and comprehensive plan of procedure. By means of records or on the advice of the salesmen, if no records are available, each man's quota can be determined and the particular line of goods to be pushed can be allotted to each district.

In the districts inhabited by the laboring people, house wiring and then the sale of inexpensive appliances such as fixtures, irons, toasters and the like, can be concentrated on. In the better residence districts more expensive appliances, such as washing machines, vacuum cleaners, lamps and the like, can be pushed. By assigning quotas the approximate gross sales can be determined, and from this information the prices at which the articles may be sold can be arrived at and some idea of the possible volume estimated.

Standardization

By proper standardization of the different classes of houses to be wired as to rooms and then as to outlets, labor and materials, a fairly low cost can be realized, and a quick turnover of labor and material obtained.

It is essential that all goods be delivered and all sales or special offers be conducted exactly as advertised. Such action acts to establish firmly the integrity and honesty of the company and of its employees, and vindicates the truth of all statements made or implied. The principal consideration is not only that the company shall establish itself as an integral and respected member of the community, but that, as a result of its reputation, it shall be able to reduce

the cost of selling and of overhead, thus making possible a lower cost to the buyer or consumer without diminishing the net profit to the company. Sales that are made by advertisements, by the circulation of printed matter and by the company's reputation are much less costly than those that are personally solicited, and are indications of right relations between the public and the company.

Above all, the utility must sell service. By intelligent publicity and service a community can be so educated to use electricity in its different applications that a large number of sales will be made automatically and the effect of competition be reduced to a minimum. Never should the impression be conveyed in advertisements or by the statement of representatives that something is being offered for nothing, as the value of the product is thus apt to be depreciated in the eyes of the public and the company, and all that is otherwise offered is apt to be regarded in a less favorable light than might otherwise be the case. The use of premiums is, of course, a different matter, but it should be always made clear that the premiums are awarded for a tangible and real consideration.

MAKING "BOOSTERS" OUT OF CUSTOMERS

When a customer has been secured his contract should be fulfilled at the earliest possible date, and all goods purchased must be promptly delivered as agreed. If the making of a connection is delayed and if a house cannot be wired so promptly as the customer thinks it ought to be, intelligent explanation by the salesman or by the office man will usually act to account satisfactorily for the delay and to keep the customer in a friendly and tolerant attitude.

Always it should be the function of the company to convert each individual member of the community into a friend and a "booster" for all things electrical, instead of having him as a "knocker" and an enemy. Where dissatisfied customers are located, or where individuals in a community are found who insist on "knocking" because of a real or fancied grievance or because of a generally hostile attitude toward the company, these individuals should be sought out, their story solicited and a reasoning and logical argument presented to overcome objections offered, so that the "knocker" may be converted into a friend and a "booster."

An electric light and power company, to become a real and vital force for community welfare, must be a public servant in the broadest sense of the word, and must enter into the community life as a progressive and honest force having the interests of the community uppermost. In serving the public and its interests the company is equally benefited and its right to existence is justified.

New Catalog of "Beaver" Tools

The Borden Company, Warren, Ohio, has just issued its 1918 catalog of "Beaver" Easy Working die stocks and square-end pipe cutters.

The attractive appearance of this catalog indicates that no expense has been spared in securing the services of the best artists and printers.

This book is printed in two colors, on high-grade paper, and illustrates in a concise and artistic manner the complete line of "Beaver" Easy Working die stocks and square-end pipe cutters.

Several new "Beaver" tools are shown for the first time in this catalog, one of the most popular of these being the new No. 3 "Beaver" junior ratchet die stock, which is built on the unit plan to thread pipe from ⅛ to 1 in., inclusive.

While this catalog is not intended for general distribution, the Borden Company will undoubtedly send a copy to any of our readers who will write a letter or card stating that they are interested in "Beaver" tools, at the same time mentioning the AMERICAN GAS ENGINEERING JOURNAL.

A Gas Kitchen for Liver Trouble

About a year ago this telephone message was received at the Camden Commercial office:

"Is this the gas company? This is Miss Blank, of No. Nought 'Teenth Street, Gloucester. Mother is terribly worried; her liver troubles her and the doctor has absolutely forbidden her to stoop. Mother bakes all our bread and won't give it up. She does most of her stooping looking after the baking in our low oven range; haven't you got a range that will not require stooping?"

We surely had and a Box Cabinet Gas Range and Water Heater were soon installed in that kitchen. One month's trial effected a cure and mother has never been bothered since with liver trouble. This can be attested to by the doctor, who has been prescribing "a gas kitchen for liver trouble" ever since. Rather easy medicine, both to give and to take! —*Charles Duus, in Service.*

44 Gas and Oil Concerns Formed in United States in November

During the month of November forty-four companies with an aggregate authorized capital of $58,530,000 were organized for the development of the oil and gas resources of this country. This figure compares unfavorble with $100,953,700, the value reached in October.

With the addition to the 1917 figure of the aggregate authorized capital for November, the record for the eleven months becomes $1,348,085,400. This amount is distributed among 1,006 companies.

Compared with November, 1916, a considerable gain has taken place, both in the number of new companies and in the aggregate of authorized capital invested in this industry. Last November only twenty-four new companies had been formed, and the authorized capital reached a level of $26,882,000.

THE PEOPLES GAS & ELECTRIC COMPANY OF ILLINOIS has applied to the Public Utilities Commission of Illinois for permission to issue $55,640 of its common stock. No decision has yet been received.

News of the Gas Industry

First Automobile Using Artificial Gas as Fuel in This Country, Makes Its Appearance in New York City

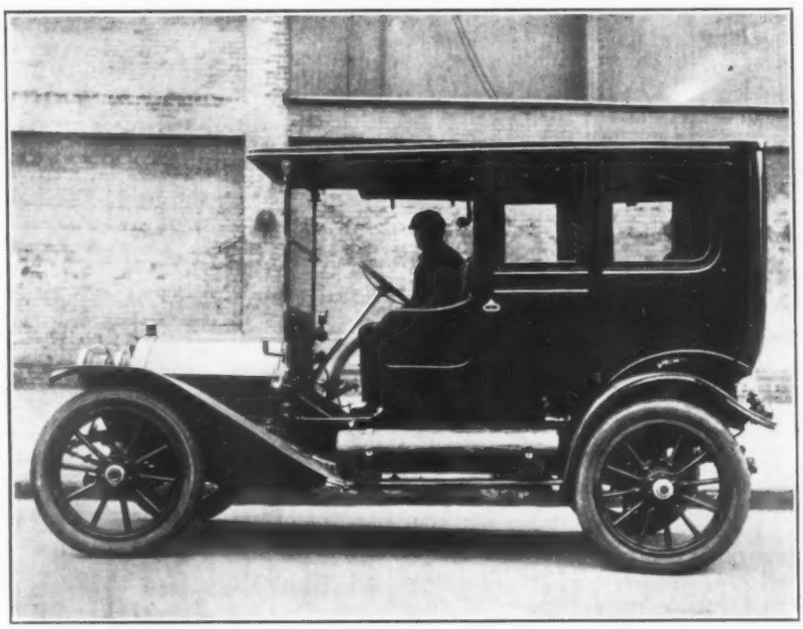
Consolidated Gas Company Construction Engineers Experiment With Considerable Success on the Use of Gas as a War-Time Expedient for Motor Propulsion

New York's first motor car to be driven by the power of artificial gas has arrived. It has made its appearance in the streets of Manhattan during the last few days, and although its coming marks an event in the automobile history of this country – for it is the first car of its kind to be operated in America, as well—thousands of New Yorkers who have seen it running about town have passed it by without observing anything unusual in its appearance.

The fact is that this artificial-gas-propelled car is so little changed in its outward looks from the ordinary gasoline kind that the metropolitan public, generally so keen for novelties and sensations, hasn't been able to detect any difference. There is a difference, however, slight as it is. Along the running board on one side of the car is an unobtrusive steel cylinder from which the gas is fed to the engine and which furnishes it with its motive power.

Owing to the abnormally high price of petrol, or gasoline, and to the urgent need of saving every ounce of that liquid fuel for the use of motor vehicles and motor transport, motorcars operated by artificial gas have come into wide and steadily growing popularity in the British Isles in the last two or three months. There is, of course, no chance of their displacing gasoline-run cars in the United States under present conditions, or so long as gasoline does not mount up around the 30-cents-a-gallon mark.

In order, however, to show the American people the mechanical possibilities of automobiles driven by artificial gas, and also to be prepared for any emergency the war may bring about, the Consolidated Gas Company recently set its expert engineers the task of producing a motorcar that would operate smoothly and successfully with the same convenient fuel that New Yorkers use in lighting their homes and in cooking their meals. The smart-looking gas-driven Cadillac limousine that made its bow to the motor world in this city last week is the result.



FIRST AUTOMOBILE APPEARING IN NEW YORK USING ATRIFICIAL GAS—TANK SHOWN ON RUNNING BOARD

The car selected by the gas company's experts for changing over to the new form was a standard Cadillac limousine which had been in the company's service for some time. Its total weight was about 4,800 lb., and its average running ability was about six miles to a gallon of gasoline.

To the running board of the limousine was fitted a steel tank of 8 in. internal diameter by 45 in. long. This tank is provided with two ½-in. connections, one for charging and the other for delivering the gas to the carbureter. On the delivery line are placed a high-pressure regulating valve and gauge, so located that the chauffeur can conveniently adjust the regulator from the driving seat. The steel gas container is charged with gas at approximately 100 lb. pressure. While on this particular car the gas container is placed along the running board, there is no reason why it could not be, if desired, placed with equal advantage on the rear of the car, or of any other car which it might be desired to change over to the artificial gas method of operation.

The experiments which William Cullen Morris, construction engineer of the Consolidated Gas Company of New York, and his assistants have made with New York's first car to be operated by artificial gas have shown that, roughly speaking, about 226 cu. ft. of gas would ordinarily be required to do the work in motor propulsion of 1 gal. of gasoline. In the case of this particular limousine, however,

which weighs 4,800 lb., it has been found that 273 cu. ft. are the equivalent of a gallon of the liquid fuel. Far greater efficiency would be obtained with a compressing plant specially built and a motorcar specially equipped. The mileage of a car running on artificial gas would depend largely, of course, on the quality of the gas, and with an increase in the pressure of the gas in the container up to around 1,800 to 2,000 lb., a good many miles could be covered on a single trip without refilling the tank.

In England, where the price of petrol, or gasoline, has now soared up around one dollar a gallon, due to the war pressure, cars of nearly every sort, from the heavy motor lorries to light parcel vans, passenger cars and the like, have been equipped for artificial gas, and are in daily use in all parts of the country. This has released for army and navy use great quantities of gasoline that were sorely needed.

About the only real difficulty the British motorists seem to have encountered have been with their devices for storing the gas aboard the car. At first crude collapsible gas bags that ballooned from the tops of the big motor-buses when inflated, and that flopped down over the sides as the gas passed out, were in general use. Recently there has been an increasing use of semi-rigid and rigid containers of various sorts. Bags of all sizes have been used during the various stages of the development of the new idea, but those holding from 300 to 500 cu. ft. of gas have been most common.

The conviction is gaining ground among our British cousins that the motorcar operated by artificial gas has come to stay even after the war. More and more English experts are daily coming to believe that there will be no great drop in the price of petrol after peace is declared, and that motor propulsion by artificial gas, seized upon as a war-time expedient, is a development of lasting economic expediency.

Coal and Coke Company Increase Capital

The Donk Brothers Coal & Coke Company, of East St. Louis, Ill., has notified Secretary of State Emmerson of an increase in its capital stock from $400,000 to $1,500,000.

Rates to be Increased Jan. 1, at Olean and Allegany, N. Y.

The Keystone Gas Company, which supplies Olean and Allegany, N. Y., is to raise its prices on Jan. 1, according to notices soon to be published.

The notices say: "Due to a greater proportional and actual increase in the cost to us, in force Jan. 1, 1918, we are very reluctantly forced to increase the price of gas to resident consumers from 35 cents to 42 cents per thousand feet, and to city, schools and colleges, from 25 cents to 34 cents per thousand feet, beginning Jan. 1, 1918. A discount of 2 per cent per thousand will be allowed as at present.

Buffalo Company Increases Rates

B. C. Oliphant, president of the Iroquois Natural Gas Company, Buffalo, N. Y., recently filed with the city the company's new gas schedules, which show an increase of 5 cents per thousand feet for natural gas to the small consumer and 10 cents per thousand feet to the big consumer, which makes the petition one in favor of the small user.

According to City Attorney Pierce, this rate will become effective Jan. 1.

Although nothing appeared in the schedules, it is probable that the gas company has the permission of the public service commission for the new rates.

35 Cent Increase Asked by Washington, D. C., Company

Permission to raise the price of gas to 80,000 Washington consumers from 75 cents to $1.10 per 1,000 cu. ft. was requested by the Washington Gas Light Company in a letter to the public utilities commission. The basis for the request is made the increased cost of materials, labor and everything entering into the manufacture of gas.

President Howard S. Reeside of the gas company, by whom the letter is signed, states that the company made voluntary reductions in cost during the years 1909-1911, when the price for the consumers was brought down from $1 to 90 cents and from 90 cents to 85 cents.

A year's trial of a 75-cent rate, suggested by the public utilities commission in 1916, resulted, according to President Reeside, in a loss in receipts to the company of $75,565.18 and a reduction in the amount of annual dividends of 25 per cent.

With the letter President Reeside also submits charts and exhibits intended to show that the increased cost of gas will make the rate of $1.10 per 1,000 cu. ft. necessary to cover the increased costs for materials and grant the company a 7½ per cent return on the fair valuation of its property.

The letter notified the commission that the company has filed a bill of complaint asking that the commission be enjoined from enforcing or attempting to put into operation any rates, tariffs, tolls or charges with respect to the plaintiff or its business, based on the valuation sought to be established in and by Order No. 209.

Rapidly Increasing Use of Gas as Fuel is Shown by Sectional Report

One of the permanently beneficial effects of war conditions on the business of the public utility corporations is seen by some of the leading operators in the rapid growth of the demand for gas as fuel. The extension of the use of gas for fuel, now necessitated by the high price of coal, these authorities feel, is likely to result in its permanent adoption where heretofore reliance has been had on other fuels, such as coal.

How great are the demands for a larger output of gas is suggested by the fact that increases of from 20 to 30 per cent are recorded at Denver, Col.; Bristol, Va.; Sedalia, Mo.; Knoxville, Tenn.; Fremont, Neb. At Lebanon, Pa., and Salina, Kan., increases in excess of 50 per cent, and Hattiesburg, Miss., of 125 per cent are noted.

THE FEDERAL LIGHT & TRACTION COMPANY and its subsidiary companies report gross earnings for the month of October of $254,714, an increase of 26.2 per cent; operating administrative expenses and taxes of $184,107, an increase of 51.1 per cent; and net income, less interest charges, was $20,097, decrease of 35.7 per cent.

Boston Mayor Seeks Repeal of Sliding Scale Act

Mayor Curley of Boston has directed Corporation Counsel William Hennessey to draft a bill to be presented in the next session of the Legislature providing for the repeal of the act making legal the London sliding scale followed by the Boston Consolidated Gas Company in the sale of gas. The Mayor's letter to Mr. Hennessey read:

"The announcement made by the Boston Consolidated Gas Company that it is to increase the price of gas to 90 cents Jan. 1, 1918, and the limited power now enjoyed by the gas and electric light commission make it apparent that the public will be forced to assume a burden that, in my opinion, conditions do not justify.

"You are accordingly directed to draft a bill for the repeal of the London sliding scale provision under which the Boston Consolidated Gas Company now operates."

Rate Increase at Ishpeming and Negaunee, Mich.

An increase in gas rates of 35 cents has been announced by John D. McDougall, district manager of the Marquette County Gas & Electric Company, Negaunee, Mich. The rate per 1,000 cu. ft. of gas consumed has been $1.25 net, and the new price, which becomes effective at once, is $1.60 per 1,000.

The reason for advancing the price at this time is due to the increased cost of production, which Mr. McDougall states is 57 cents on each 1,000 cu. ft., while the increase in the price does not reach that sum, being but 35 cents on the thousand. It is claimed that the gas business has not shown a profit in some time, and in order to continue in business the increase in the charges is absolutely necessary. Mr. McDougall states that gas has always been sold at very close margin in Ishpeming and Negaunee, and that for some months past it has been impossible to operate at a profit. In order to continue the gas end of the business the increase was necessary, otherwise that branch of the enterprise would have to be given up entirely.

Minneapolis Gas Light Company Asks for Rate Increase and Change to Heat Unit Standard

Declaring that war prices for raw materials and government demands have made it impossible to meet fixed charges and operating expenses, the Minneapolis Gas Light Company, through its president, A. T. Rand, recently asked the city council to permit an increase in rates and revision of the provisions affecting candle-power and heat units.

The petition presented to the aldermen says that the price now charged for gas, 77 cents per 1,000 cu. ft., was ample to meet operating expenses and fixed charges until the war caused conditions to change. It says that the cost of gas has increased approximately 23 cents per 1,000 cu. ft.

Cost Data in the Petition

"During the first three months of the present year, the average cost of gas coal was $4.38 per ton, oil (large quantities of which are used in the process of manufacturing) 5½ cents per gallon, and steam coal $4.01 per ton. These average prices were due to deliveries on unexpired contracts and utilization of stock on hand. It may also be said that they were in excess of prices prevailing during the period prior to Jan. 1, 1917. The result of these three months' operation indicates a deficit of $15,000, which amount, for the purpose of illustration, may be disregarded, and the assumption that the company's income and expenditures during this period were practically equal be accepted.

"Prices on these necessary materials since April 1 have steadily advanced, until at the end of the tenth month, or seven months from April 1, the company finds itself compelled to pay $8.14 per ton for gas coal (an increase of 86 per cent), $7.44 per ton for steam coal (an increase of 86 per cent) and 6¾ cents per gallon for oil (an increase of 18 per cent). These constantly increasing prices for gas-making materials have resulted during the ten months to Nov. 1 in a deficit aggregating $227,000, or, for the seven months above mentioned, $212,000 less than the amount necessary to pay its bond interest and sinking fund charges.

Request Heat Unit Standard

"We regard it as being proper in this communication to call the attention of your honorable body to the fact that this company has been required by the Government, as a war measure, to furnish in the immediate future certain ingredients, now contained in its gas, for the Government use. It is assumed that the removal of such ingredients will materially reduce the candle-power of the gas, while only to a comparatively slight extent lowering its heating value, whereby the consumer, in the use of modern appliances, is in no appreciable way deprived of practically its full efficiency.

"It seems imperative that this situation makes necessary a change not only in the price, but in the quality of gas furnished by this company."

The request was referred to the committee on public lighting and one alderman from each ward.

Denver Now Stripping Gas for Toluol

The Denver Gas & Electric Company is now turning out tuluol to help the Government in the manufacture of the powerful explosive trinitrotoluol, used by heavy artillery, according to William J. Barker, vice-president and general manager of the company.

Mr. Barker recently corroborated the report that his concern, in common with many other gas companies throughout America, is doing its bit to help win the war.

New Contract Ordered for Purchase of Certain Boston Gas

The Gas and Electric Light Commission of Massachusetts considered the petition of the Boston Consolidated Gas Company to purchase gas from the New England Fuel & Transportation Company at 29.5 cents per 1,000 cu. ft. recently. The price is the same as paid by the distributing company to its subsidiary under the old contract, but there are several changes in the document. The commission ruled that it should be redrafted and a new hearing held.

20 Per Cent Rate Increase at Tacoma, Wash.

New gas rates 20 per cent higher than the old schedules for Tacoma were allowed by the public service commission. The Tacoma decision also includes Puyallup and Ruston. The commission, however, went on record as opposed to the "ready-to-serve" charge, and cut this charge from the rate schedule proposed by the gas company. An entirely new schedule was arranged to go into effect at once. Notification of this decision was sent to attorneys for the cities interested.

The commission suspended the gas-heating rates proposed for Pierce County pending further investigation. The old rates will apply until a decision is reached.

The ruling against the "ready-to-serve" charge will affect all the cities in which the gas company has asked for increased rates. When the final decision in the Olympia case is reached the revised schedule will abolish this item completely.

Increase in Price of Coal Adds to Cost of Gas Supply at Colorado Springs, Col.

A raise of 45 cents a ton on coal used by the Colorado Springs (Col.) Light, Heat & Power Company for manufacture of gas recently became effective, and, according to Manager J. F. Dostal, will increase the cost of the company's gas department by $1,000 a month. The coal used for gas comes from near Trinidad and is the only coal in this section of the country that can be used for this purpose.

WESTERN POWER COMPANY OF CANADA, LTD., Vancouver, B. C., reports for October, 1917, operating revenues, $40,775.36, an increase of 17.2 per cent compared with the same month last year, and net earnings of $30,227.46, an increase of 37.1 per cent compared with October, 1916. The net earnings for the year 1917 to date are $269,716, compared with $210,126 in 1916. For the twelve months ended October, 1917, the net earnings are $338,378.07, an increase of 34.1 per cent over the twelve months ended October, 1916. Interest on bonds and debentures is now at the rate of $285,000 per year.

Lease Expired—Geneva Company Again Resumes Control of Coke Plant

One of the most important business changes in years in Geneva, N. Y., since the organization of the company itself took place Dec. 1, when the Empire Coke Company took over the plant of the company at Border City. This plant furnishes gas to the Empire Gas & Electric Company, which supplies the cities of Auburn and Geneva and the towns of Waterloo, Seneca Falls and Lyons.

The Empire Coke Company was organized by E. H. Palmer and the plant was run for a number of years, the coke being disposed of principally for home consumption. Five years ago the plant was leased to the Semet-Solvay Company, of Syracuse. This company developed the by-products and sold in Syracuse in the neighborhood of 25,000 tons of coke a year. The lease of the company was not renewed, and at the end of five years, which expired Dec. 1, the plant was again taken over by the Empire Coke Company.

A number of improvements are already under way, and it is declared to be the intention to improve the quality of gas immediately and to distribute coke first among local consumers. This may mean the shutting off of the coke shipments to Syracuse.

The home office of the company will be in Geneva, and as a result of the transfer the plant again becomes a local concern, which will be directed from the home office in Geneva instead of from Syracuse, as has been the case since the plant has been in the control of the Semet-Solvay Company.

Chicago Company Assessment Determined

The Peoples Gas Light & Coke Company, of Chicago, this year will have to pay State taxes on an assessment of $49,659,000, as the result of a decision of the Illinois State Board of Equalization last week. The board's assessment was on a 70 per cent basis. According to the assessment, therefore, the board apparently valued the property of the Peoples company at $70,000,000.

Need for General Economy in Boiler Rooms

In discussing the general need of fuel conservation in the boiler rooms, Van H. Manning, Director of the Bureau of Mines, Department of the Interior, has issued the following statement:

"There is one phase of the present coal situation which may put an entirely different light on the supposed increased production of coal of the present year. In round numbers, there was produced 600,000,000 tons of fuel last year. Statement has been made that 50,000,000 more tons will be mined this year. The preparation of this increased quantity of coal has not been as good as in times past. Analyses of samples show in many cases a greatly increased quantity of ash. Repeated cases are brough of ash. Repeated cases are brought to the attention of the Bureau of Mines where coal which would run from 6 to 8 per cent ash in normal times is running from 12 to 18 per cent of ash in these abnormal times. Complaint about the preparation of coal is very general, and it is not at all improbable that 5 per cent more ash is included in this year's coal than in previous years. If such a figure is true, it means that 32,500,000 tons of the estimated output of 650,000,000 tons is nothing but increased ash. If we can imagine over 600,000 carloads of ash being added to the present burden of transportation, the evident effect on car supply and transportation troubles would be seen. If this were the end of the matter, it would not be so bad; but there is another factor well known to engineers which is apt to be overlooked by the non-technical user. The extensive experiments carried on by the Government at the St. Louis Exposition showed that, with the coals used, there was a decrease of about 1½ per cent in efficiency for each 1 per cent addition to the ash content of the coal—that is to say, the inclusion of more ash with the coal decreases the value of the fuel not only the amount equal to the useless ash, but it makes the remaining good coal less effective to the extent of 1½ per cent for each 1 per cent of ash. The inclusion of 5 per cent more ash in the fuel,

(*Continued on page* 16, *Advertising Section*)

Council For Illinois Commission Makes Clear Statement of Commission's Attitude on General Rate Increase

The public utilities of Illinois, and particularly the gas companies, are practically invited to apply for increased rates in a letter from Harleigh H. Hartman, counsel for the Illinois Public Utilities Commission and professor of utilities law at Northwestern University, which was published in a recent issue of the *Manufacturers' News*, the official organ of the Illinois Manufacturers' Association.

Mr. Hartman's letter is quite a thesis on the utilities situation in Illinois, and his attitude on the question of rates is looked upon as being also that of the commission. After blaming certain Illinois gas companies for their delay in presenting to the commission their claims for increased rates, Mr. Hartman says:

"While the commission has stated its realization of the gravity of the present situation, the limitations, physical and legal, under which it operates may prevent it from taking further steps than it has to aid the companies."

Mr. Hartman's letter follows in part, the sections of it that are excluded pertained to utilities other than gas companies:

"Having read your comment upon my previous letter, I accept your invitation to discuss the public utility situation further. You write, 'A suggestion to the managers of most of the public utilities of Illinois to come in and make a showing would be favorably received.' I trust I may be excused in calling your attention to the contents of the Rockford Order I. P. U. C. No. 6,617, 1917—P. U. R—196, referred to in my former communication. That order closes thus:

" 'If the Rockford Electric Company wishes to submit to the commission, in form as prescribed by law and the rulings of the commission, a schedule of rates definite in its application, and is prepared to make a showing that such changes are necessary and that the altered rates will be just and equitable, the commission will consider the case upon its merits and enter such orders as it deems just and reasonable. Such showing as to the justice and equity of the proposed rates should be made by such means as the utility may deem proper, and may be made upon the basis of past operating expenses and property values, or upon the basis of comparison with other rates. Such schedule, if it be predicated upon the increased cost of operation, due to present unsettled economic conditions, might well be filed as operative and effective for a certain definite future period within which such conditions will without doubt continue to exist.'

"Could the commission have expressed a plainer invitation to the utilities of Illinois or expressed it more emphatically than it has by including it in a formal order? If the utilities of the State face wholesale bankruptcy, surely they are not ignorant of this order, or are negligent in not availing themselves of its suggestion, or in failing to familiarize themselves with the commission's rulings.

"You doubt the impracticability of a general rate increase for utilities other than common carriers. May I point out that the legality of such an order under the ruling of the State Supreme Court in the case of the Public Utilities Commission vs. the Chicago and West Towns Railway Company, No. 275, Ill., 555, 565, would be very questionable. Many of the utilities are now operating under schedules based upon present prices. These companies would obviously have to be excluded from the proposed increase. Many utilities are serving at rates whose reasonableness, never having been challenged, never has been tested. Any general increase including such companies would seem to be illegal, as establishing an increased rate without a hearing as to its particular merits.

"Contract prices could not be considered in any general rate increase order.

"The ratio of coal and material costs to operating expenses and of operating expenses to income are not the same in the case of any two utilities, therefore a general increase would work differently in the case of each company, and while justifiable as to some, might produce unreasonable rates in the case of others where operating expenses were not so low. The mere fact that the increase would be based upon the cost of coal, oil and labor in the case of each utility would in no way cause the effect on each to be similar.

"Such a general advance would destroy the past work of the commission in rate making, would alter the rate of return previously fixed as proper for the several utilities passed upon, and would vitiate the commission's attempt to reward economic management.

"The rates barely permissible at existing figures would be advanced to an impossible point by a general increase which would barely cover the added expense in the case of utilities entitled to full protection. Such an increase in such cases would, experience has shown, result in a decrease in revenue rather than an increase, for it would lessen consumption. Many other features of a general increase would prevent the adoption of this suggestion by the commission. . . .

"Rate advances have been authorized upon the general grounds of insufficiency of return in twenty cases since Sept. 1, and a number of new schedules of rates taking into consideration existing conditions, filed by utilities entering new territory, have been accepted by the commission.

"The rates of the Peoples Gas, Light & Coke Company, of Chicago, cited as an illustration, were fixed July 26, 1917, by an order of the commission (No. 7,025), approving a settlement ordinance entered into by the city of Chicago and the utility. If those rates are not formulated to meet present conditions, the negligence is surely that of the utility itself, since it proposed the schedule.

"In the case of the North Shore Gas Company surely the neglect to file a request for an increase until Sept. 25 must be charged to the utility, not to the commission, which has promptly considered the matter since it has been presented to it in the regular course.

"While the commission has stated its realization of the gravity of the present situation, the limitations, physical and legal, under which it operates may prevent it from taking further steps than it has to aid the companies. Surely one familiar with the scope of the commission's work and its facilities would not suggest that it undertake an investigation on its own motion of the financial status of every utility within its jurisdiction. The work connected therewith would preclude definite action within any reasonable time limit. The commission has met the situation, therefore, by requesting such utilities as desire

increases, who above all others have the information most available, to prepare and present the evidence showing the necessity for advanced rates. If that request be unreasonable, are we not making much of a little matter in our efforts to aid those utilities who are unwilling to aid themselves?

"Summarized, the situation amounts to this, be it practical or impractical, neither the utility companies or commission is above the law, both must conform to its mandates. The law limits the methods of procedure, and the writer suggests that critics of the present situation could, to advantage, familiarize themselves with these limits. If the utilities will follow the suggestions of the commission, pointed out many weeks ago, they will find that board a body of courteous gentlemen, backed by an efficient organization, not only ready but eager and able to render them such speedy assistance as may be found necessary and compatible with the public welfare."

THE WRIGHTSTOWN UTILITIES CORPORATION, manufacturing and distributing gas at Asbury Park, N. J., has recently been incorporated, with a capital of $25,000. Incorporators: Joseph P. Watson, Arthur F. Cottrell, J. Claude English, Asbury Park.

THE AMERICAN PUBLIC UTILITIES COMPANY reports gross earnings for the twelve months ending with October of $4,048,289; net, $1,773,634, and balance above preferred dividends, $236,547.

Personal Notes

DAVID O. HOLBROOK, of Pittsburgh, secretary of the Natural Gas Association of America, was named to direct the distribution of natural gas for industrial purposes in the United States in connection with the priority committee and the war industries board. His work will be to see that munition factories get preferential service by gas companies. Mr. Holbrook will spend three days a week in offices to be opened for him in the Council of National Defense building in Washington. His Pittsburgh offices are in the Oliver Building. The new gas administrator is known in the natural gas trade. He is a vice-president of the Natural Gas Association, and has been president of the Association of Natural Gas Supply Men five years. Mr. Holbrook went to Pittsburgh from the University of Iowa in 1893, and started to work for a Uniontown coke concern. He was in the steel business several years before entering the gas supply trade. His home is 4029 Northminster Street, Northside.

WILLIAM FRANK has been appointed commercial manager of the Lebanon (Pa.) Gas & Fuel Company, succeeding E. S. Palmer. He has been with the company about a year, and his rise in position is due to his active services.

E. S. PALMER, commercial manager of the Lebanon (Pa.) Gas & Fuel Company, has been granted a temporary leave of absence on account of impaired health, and will return to his home in the South. Mr. Palmer may later take a position somewhere in the Southern climate with the same interests that control the Lebanon company. He is succeeded by William Frank.

M. C. PARK, a director of the recently organized Dixie Gas Company, of Birmingham, Ala., has been made general manager of the company.

G. T. WOFFORD, a prominent oil man, and A. R. FORSYTH, vice-president of the Gulf States Steel Company, have recently been elected directors of the Dixie Gas Company, of Birmingham, Ala.

ALEXANDER WYNESS, who for the past nine years has been superintendent of the gas department of the South Carolina Light, Power & Railway Company, Spartanburg, S. C., recently resigned. He will remain a resident of Spartanburg, engaging in another line of business.

LEONARD S. CAIRNS, assistant general manager of the Manila Electric Railroad & Light Company, Manila, P. I., has been appointed general manager of the Eastern Pennsylvania Railways Company, Pottsville, Pa., by the J. G. White Management Corporation, New York City, the operating managers of both companies. Mr. Cairns has arrived in the United States and has assumed the duties of his new position. He succeeds L. H. Palmer, who lately became assistant to the president of the United Railways & Electric Company, Baltimore, Md. Mr. Cairns upon leaving high school entered the employ of the Twin City Rapid Transit Company, Minneapolis, Minn., and after several promotions was made general superintendent of that company. In 1912 he was employed by the J. G. White Management Corporation to fill the position of assistant general manager of the Manila Electric Railroad & Light Company.

RICHARD J. HALLORAN, who has been up to the present time new business manager of the Luzerne County Gas & Electric Company at Kingston, Pa., will on the first of the year enter the selling force of Bartlett & Company, Inc., who have been for fifteen years continuously the distributers for the eastern Pennsylvania district of Ruud automatic water heaters. Mr. Halloran, although a young man, is a veteran in the gas business, having started his career as fitter with the United Gas Improvement Company, Philadelphia, and having been successively foreman of the South Jersey Gas Company at Riverton, N. J., foreman for the Chester County Gas Company at West Chester, Pa., and foreman of distribution with the Coast Gas Company, Belmar, N. J. His experience in the sales end of the gas business began about ten years ago, when he became salesman for the then Merion & Radnor Gas & Electric Company at Ardmore, Pa., which position he held during seven out of the eight years of his connection with that company. Since leaving Ardmore he has been commercial agent for the Eastern Gas Works and new business manager at Kingston, Pa. His ample experience, both in the shop and sales department, assures him a flying start to success in his new field.

JOHN O'MALLEY has been appointed superintendent of the Empire Coke Company, of Geneva, N. Y., succeeding H. L. Moore. Mr. O'Malley assumed his new duties Dec. 1.